

In the Claims

1. (Currently amended) A Viterbi decoder including a number of classical Add-Compare-Select units and a number of further an Add-Compare-Select unit having a lower complexity butterfly unit (300) having only two adder means, such that the further Add-Compare-Select unit comprises comprising:

first adder means (310) for receiving a first path metric and a branch metric and for producing at its output the addition thereof;

second adder means (320) for receiving a second path metric and said branch metric and for producing at its output the addition thereof;

first comparator means (330) coupled to receive the output of the second adder means and coupled to receive the first path metric for comparing therebetween;

second comparator means (340) coupled to receive the output of the first adder means and coupled to receive the ~~first~~ second path metric for comparing therebetween;

first selection means (350) for selecting between the second adder means output and the first path metric to produce a first survivor path metric in dependence on the first comparator means comparison; and

second selection means (360) for selecting between the first adder means output and the second path metric signal to produce a second survivor path metric in dependence on the second comparator means comparison,

for processing metric transitions via the lower complexity butterfly unit only where a second branch metric is zero.

2. (Canceled).

3. (Original) The Viterbi decoder of Claim 1 adapted for code rates of the type $R = k/m$, where $k > 1$, and k and m are integers.

4. (Currently amended) A method of producing metrics for use in a Viterbi decoder comprising a number of classical Add-Compare-Select units having a butterfly unit and a number of further Add-Compare-Select unit(s) having a lower complexity butterfly unit (300) wherein the method comprises the step of:

determining when a branch metric is zero, and in response thereto the method comprises the steps of:

selecting the lower complexity butterfly unit (300) to perform only two adding steps comprising:

selecting metrics such that for at least some trellis transitions a branch metric is zero, whereby a simplified Add-Compare-Select butterfly unit may be used

adding a first path metric and a branch metric to produce a first addition;

adding a second path metric and said branch metric to produce a second addition;

the method further comprising the steps of:

comparing the second addition and the first path metric to produce a first comparison;

comparing the first addition with the second path metric to produce a second comparison;

selecting between the second addition and the first path metric to produce a first survivor path metric in dependence on the first comparison; and

selecting between the first addition and the second path metric to produce a second survivor path metric in dependence on the second comparison.

5. (Currently amended) The method of claim 4 wherein the metrics are selected by subtracting from each of a predetermined set of metrics a chosen one thereof to produce a resultant set of metrics having at least one zero value for processing by the lower complexity butterfly unit (300).

6. (Original) The method of claim 4 further comprising re-adjusting the dynamic range of the selected metrics by multiplying each of the selected metrics by a scaling factor if the following property is satisfied:

$$m_a(\text{bit} = 0) = -m_a(\text{bit} = 1) \forall a$$

7. (Currently amended) The method of claim 6 adapted for Orthogonal Frequency Division Multiplexed (OFDM) coding.

8. (Original) The method of claim 6 further comprising adapting the selected metrics to additive noise.

9. (Currently amended) The method of claim 8 wherein the additive noise comprises coloured noise.

10. (Original) The method of claim 4 adapted for code rates of the type $R = k/m$, where $k > 1$, and k and m are integers.

11. (Currently amended) A butterfly unit for use in a Viterbi decoder Add-Compare-Select unit, the butterfly unit (300) comprising only two adder means comprising:
 first adder means (310) for receiving a first path metric and a branch metric and for producing at its output the addition thereof;
 second adder means (320) for receiving a second path metric and said branch metric and for producing at its output the addition thereof;
and further comprising
 first comparator means (330) coupled to receive the output of the second adder means and coupled to receive the first path metric for comparing therebetween;
 second comparator means (340) coupled to receive the output of the first adder means and coupled to receive the second ~~first~~ path metric for comparing therebetween;
 first selection means (350) for selecting between the second adder means output and the first path metric to produce a first survivor path metric in dependence on the first comparator means comparison; and
 second selection means (360) for selecting between the first adder means output and the second path metric signal to produce a second survivor path metric in dependence on the second comparator means comparison.

12. (Original) The butterfly unit of claim 11 adapted for code rates of the type $R = k/m$, where $k > 1$, and k and m are integers.